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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/701,476

11/06/2003

Keiji Fujita

04329.3172

8591

7590

10/06/2004

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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/701,476

Applicant(s)

FUJITA ET AL.

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-9, drawn to a semiconductor device, classified in class 257, subclass 758.
    - Species Ia, drawn to a semiconductor device comprising a porous insulating film formed above the semiconductor substrate, said porous insulating film have a relative dielectric constant of 2.5 or less and including a first insulating material, at least a portion of pores in the porous insulating film having on the inner wall thereof a layer of a second insulating material which differs in nature from said first insulating material.
    - Species Ib, drawn to a semiconductor device comprising comprising a porous insulating film formed above the semiconductor substrate, said porous insulating film have a relative dielectric constant of 2.5 or less, an average diameter of pores in said porous insulating film being smaller in a surface region of said porous insulating film than in an inner region of said porous insulating film.
  - II. Claim 10-20, drawn to a method for manufacturing a semiconductor device, classified in class 438, subclass 622.

- Species IIa, drawn to a method for manufacturing a semiconductor device comprising wherein prior to filling the recessed portion with the conductive material, said porous insulating film is placed inside a chamber to expose said porous insulating film to an oxidizing gas flow and a reducing gas flow which have been alternately introduced into the chamber, to take place an oxidation-reduction reaction in said porous insulating film, thereby forming a layer of reaction product on the inner walls of pores of said porous insulating film.
- Species IIb, drawn to a method for manufacturing a semiconductor device comprising wherein the porous insulating film is irradiated with electron beam to enlarge the size of pores of the porous insulating film.

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product invention I structure can be made by another and materially different process. For example, a plug and/or wiring layer buried in the porous insulating film can be formed by providing a plug and/or wiring layer's pattern then depositing the porous insulating film to bury the plug and/or wiring layer instead of

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forming a recess portion on a surface of the porous insulating film then filling the recessed portion with a conductive material to form the plug and/or a wiring layer.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

2. The product invention I of this application contains claims directed to the following patentably distinct species of the claimed invention:

la. Species Ia, drawn to a semiconductor device comprising a porous insulating film formed above the semiconductor substrate, said porous insulating film have a relative dielectric constant of 2.5 or less and including a first insulating material, at least a portion of pores in the porous insulating film having on the inner wall thereof a layer of a second insulating material which differs in nature from said first insulating material. It appears that claims 1-5 read on species Ia.

Ib. Species Ib, drawn to a semiconductor device comprising comprising a porous insulating film formed above the semiconductor substrate, said porous

insulating film have a relative dielectric constant of 2.5 or less, an average diameter of pores in said porous insulating film being smaller in a surface region of said porous insulating film than in an inner region of said porous insulating film. It appears that claims 6-9 read on species Ib.

The product invention II of this application contains claims directed to the following patentably distinct species of the claimed invention:

Ila. Species Ila, drawn to a method for manufacturing a semiconductor device comprising wherein prior to filling the recessed portion with the conductive material, said porous insulating film is placed inside a chamber to expose said porous insulating film to an oxidizing gas flow and a reducing gas flow which have been alternately introduced into the chamber, to take place an oxidation-reduction reaction in said porous insulating film, thereby forming a layer of reaction product on the inner walls of pores of said porous insulating film. It appears that claims 10-16 read on species Ila.

Ilb. Species Ilb, drawn to a method for manufacturing a semiconductor device comprising wherein the porous insulating film is irradiated with electron beam to enlarge the size of pores of the porous insulating film. It appears that claims 17-20 read on species Ilb.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

3. A telephone call was made to Richard Burgujan on 08/18/04 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

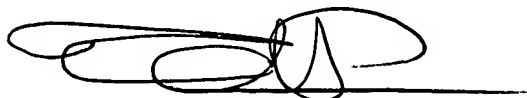
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4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Patent Examiner  
Patent Examining Group 2800